



GIZ e sus actividades no mundo

Projetos atuais de biogás

Florianopolis, 06.07.2011

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The Deutsche Gesellschaft für Internationale Zusammenarbeit

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GIZ Range of Services



Economic Development and Employment



Governance and Democracy



Health, Education, Social Protection



Water, Energy, Transport



Agriculture, Fisheries and Food



Environment and Climate Change



Security, Reconstruction and Peace

**Organisational
and
Management Consultancy**

Knowledge Management

➤ Energy access/basic energy

- Cooking energy
- Rural electrification

➤ Renewable Energy

- Wind energy
- Bioenergy
- Hydropower
 - Mini-Hydropower
 - Sustainable large Hydropower
- Solar energy
- Others (Geothermal, ...)

➤ Energy Efficiency

- EE in Buildings
- EE in Equipment
- EE in the Industry
- EE in therm. Powerplants

➤ Strategic processes, Energy and Climate protection

- International Processes and Networks
- Energy planing
- Carbon markts / Emission traiding





GIZ Instruments and Levels of Intervention

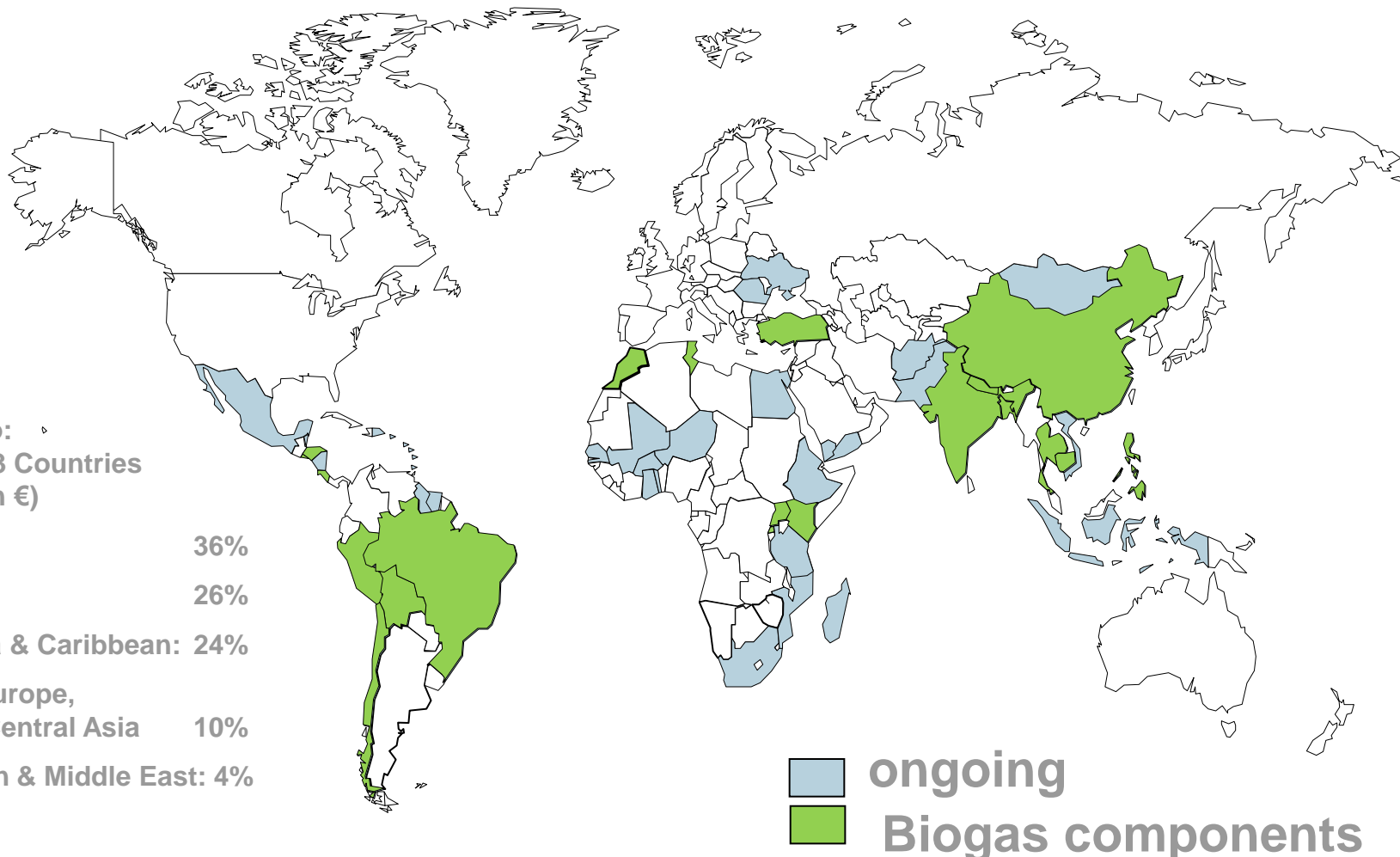




Biogas projects in international cooperation



GIZ Services for Energy – Regional Distribution Energy Projects 2011





Types of Biogas projects

- By objective:
 - Poverty reduction by energy access
 - Waste water treatment by anerobic digestion
 - Reduction of CO₂ emissions
 - Production of renewable energy
 - Generation of economic benefits
- By Inputs:
 - Agricultural Residues: Manure, dung, residues from animal feed etc.
 - Industrial residues: organic residues from food and feed proessing industry, from pharmaceutical industry, slaughter houses etc.
 - Municipal Residues: Organic residues from housholds, separaded or non separaded



Types of Biogas projects

- By Technology
 - Low cost: mainly to use gas in decentral areas
 - Middle cost lagoon plants: for waste waters with high organic content and use of own energy content
 - High tech-Plants: For the optimized production of energy, mainly to sell energy (in many cases to sell electricity to the grid)
- Technology
 - Wet fermentation
 - Dry fermentation



High-Tech

Aim: Efficient electricity generation and feed-in to the grid; **Countries:** China, Chile, Turkey...

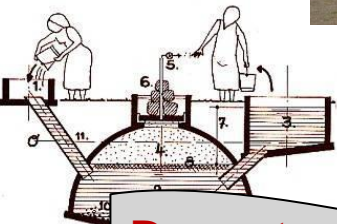


Middle-Tech

Aim: Reduction of pollution / CDM and energy production for own use; **Countries:** Brasil, China, Thailand, India

Decentralized Household-plants

Aim: Electricity generation, cooking / lighting
Countries: Nepal, India, China



Increasing development / economic growth in countries and regions →



Current biogas projects: Thailand

- The topic biogas production already exists in Thailand for 20 years
- Used to clean water from the palm industry
- Start the CDM technology with comparably cheap technology
- Problem: Efficiency reaches only 30% of the expected → The adequate amount of certificates CDM (CER) is not received
- Therefore:
 - Development of an association to support biogas plant operators
 - Implementation of monitoring systems to improve the analysis (PPP with CDM developer First Climate)
 - Participation of Thai operators and developers in a GIZ workshop in China





Methane 2 Power

- Technological Expertise: Energy Research and Development Institute, Chiang Mai University (ERDI)
- Financial Support: Energy Policy and Planning Office (EPPO)
- Objective: Promote the production and utilization of biogas in the agricultural sector:
 - promote the production of methane from agro industrial and agricultural waste for heat and power generation
 - enhance the technical capability of biogas production and utilization
 - encourage a forming of a Thai biogas network



Status and targets of Biogas Energy in Thailand

- Heat Production:
 - Status: 378.66 ktoe
 - Target 2012: 86.59 ktoe
 - Potential: 754.42 ktoe
- Electricity Production
 - Status (MW): 137.58 [mostly Palm Oil (74)]
 - Target 2012 (MW): 35.40
 - Potential (MW): 191.58



Turkish-German Biogas-Project



Starting point of the project

Environmental problem: Waste from livestock and waste water from agro industry is responsible for:

- Water pollution
- Greenhouse gas emissions
- Smell





Example of staples with 40 bulls





Example of staple with 400 bulls





Example of staple with 400 bulls





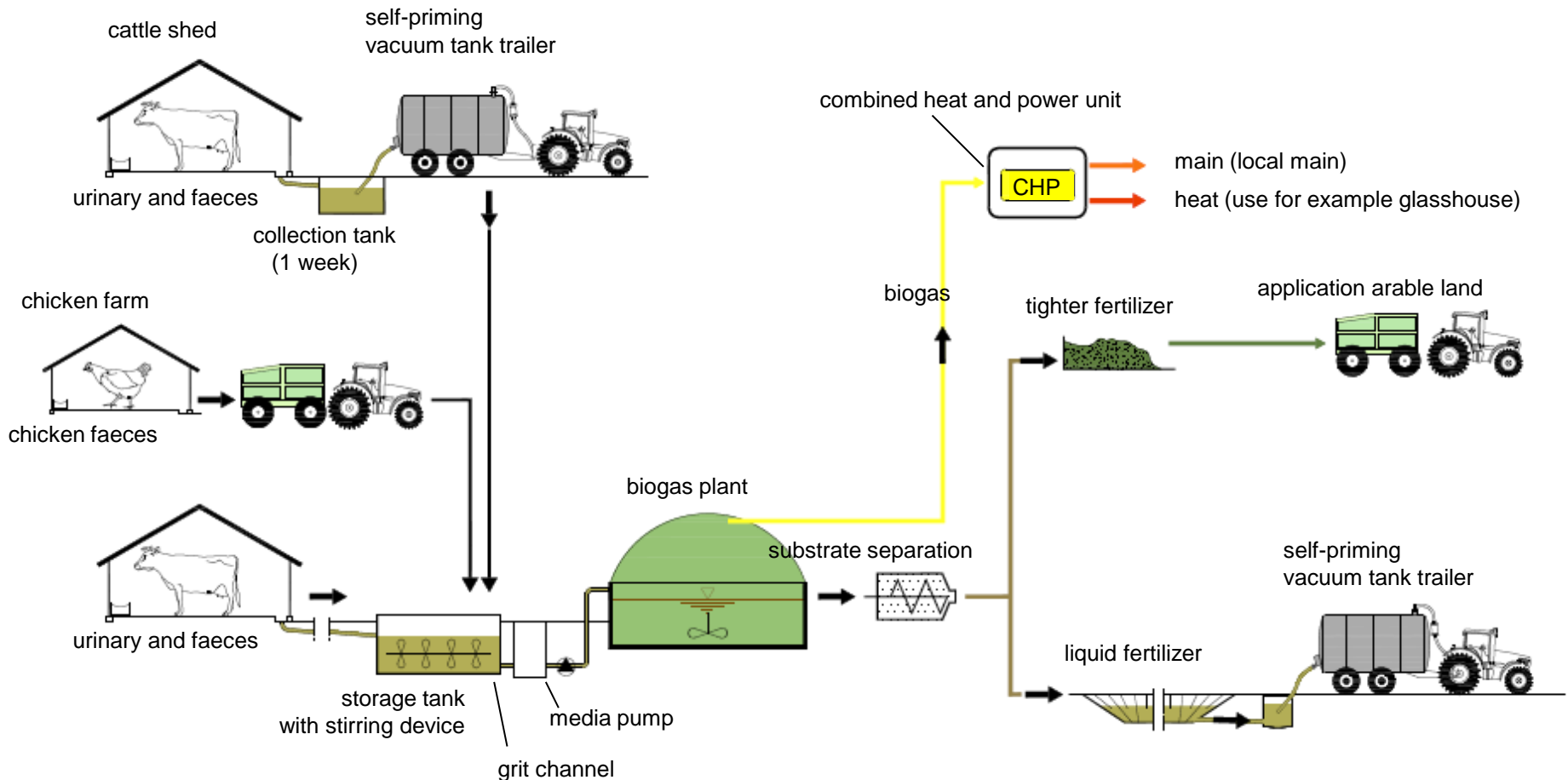
1. National level: Promoting Framework conditions

- Development of a national biogas strategy
- Dialogue with political decision makers, private sector, science NGOs,
- Integration of sustainable biogas (waste, energy, fertilizer) in laws and regulations
- Capacity Building on national level (building up an neutral biogas/bioenergy institution)
- Private investment strategy for biogas (also PPP)
- Using German Know-How and technology
- Monitoring of impact

2. Local level: Industrial pilot biogas plants in the regions

- Support of the local government agencies and farmers capacities: Technical advisory for modernization of the agriculture, barns and construction of infrastructure and biogas
- Biogas investment trough private sector/investor
- Using German Know-How and technology
- Technical and financial support for holistic biogas concept biogas concepts (Feasibility studies, business planes, investment and operation models, construction support)
- Enforcement of the environmental laws

Holistic Biogas-Approach





Holistic Biogas-Approach

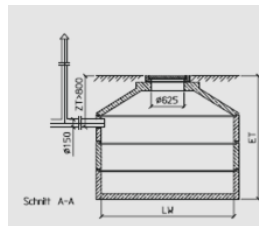
- Investment models with holistic character on local level („cheap“ substrates and manure) -> requires support for modernization of agriculture especially for small farmers and operation models with longterm available substrates
- Therefore:
 - 1) Political support for use of manure (environmental Bonus, Manure-Bonus)?
 - 2) Incentives for local modernization of agriculture: Breeding (construction of staples, storage of manure) and use of fertilizer

1. Modernisation of staples



(Quelle: www.hau-stallsysteme.de)

2. Manure storage



(Quelle: www.rhebau.de)

3. Transport



(Quelle: KTBL, Gülle – Mengen genau ermitteln, Proben richtig ziehen)

4. Use of fertilizer





Current biogas projects: China

- More and more large projects are implemented in China, but the efficiency of the plants is very low.
- In cooperation with the Ministry of Agriculture the project was developed
 - „Use of bioenergy for heat and power production in the framework of technical cooperation“

Renewable Energies: Optimization of Efficient Biomass Utilization



项目总体目标 / Overall Project Objective

The overall objective* of the **GTZ Biomass Utilization Project** is:

..... to improve the technical standard and the (operational) performance of medium- and large-scale biogas plants (MLBGPs) that produce energy from biomass.

项目的总体目标在于:

.....提高大中型沼气发电厂（利用生物质生产能源）的技术标准和运行水平

* PIA 7/2009 根据中德双方达成的项目实施协议





11 ADB CSP Analysis 11个核心子项目详细技术分析

CSP	AD HRT capacity	CHi capac	BG Flare	gas air	Process monitor ring	Fertilizer storage capacity	Other additional investment to improve / amend
Hexie HEL		□		□	□		Biogas dehydration
Jinli HEL		□		□	□		
Haoyun HEN	□	□		□	□	□	Biogas grid, Fertilizer distribution system
Huimin HEN	□			□	□	□	Feedstock processing,
Wei Wei JIANGSU				□	□	□	
Jinmu JIANGXI	□			□	□		Additional biogas desulphurisation
Lulin JIANGXI		□		□	□	□	Heat exchangers, fertilizer dehydration, no orchards financed
Lvyuan SHA	□			□	□		Safety technology
Zhong- kang SHAD		□		□	□		Biogas desulphurisation
Jiyuan SHAN				(□)	□		(no flair if alternative biogas usage)
Wantong SHAN	□			□	□		
11	5	5		10	11	4	

(□ = needs further consideration), see details in Supplementary Appendix H.

**Summary of
indicative
needs
assessment for
technical
upgrading of 11
MLBGP CSP's
to „international
best practice’
standard under
the ADB loan**

亚行贷款项目11
个核心子项目可
研关键指标评估
结果表明需要提
升技术以达到
“国家最优标准”



Example: EZ-approach in the SINO-German
**Biomass Utilization Project: 'Renewable
Energies – Optimization of Biomass
Utilization'**

Vertical Support to
Biogas-DEMO Projects

Horizontal Support to ADB sub-projects

Component B: Capacity building, dissemination and replication
for large scale biogas plants

Component C: Sector policy framework

Component D: Technical support to central and provincial PM for
ADB Project implementation

Component A: Support
to 3-5 Biogas 'best
practice' demonstration
projects in 2-3 Provinces



Short List of 19 Demo project candidates and 7 Demo Projects proposals (green)*

7个示范项目短名单

see Annex 3: Preliminary short list of 7 SINO-GERMAN Demonstration Projects





Lunan – Yingtai, Shandong: ADB+GEF+CEFPF+GTZ Demoproject chicken breeding and processing 山东鲁南盈泰（肉鸡养殖和加工）

2mn Chicken from 40 farms and 40.000 c/d processing
Centralized co-fermentation project (chicken-sewage sludge from slaughterhouse)

Cooperation capacity: high as partner of Mc-Donalds, KFC, Japan and Europe, and the existing WWTP as a reference

ADB+GEF+CEFPF+GTZ, NDRC (MOA support), private investors (DEG,) middle size 40.000t/yr, 0.9 MW, budget: 27.6 million CNY,
Planner: FSR by Tianren, detail designer and BG technology to be decided
Specific site requirement: in the JingHang water supply canal protection area,

Provincial **Training Center** possible





Suichuan, Jiangxi, (middle size pig BGP)

江西遂川（中等规模猪场沼气工程）

middle size, 20.000 pigs

**36.000 t/yr, 0.1 MW,
ADB (MOA support)**

8 Million CHY

failed with UASB BGP investment in 2005

CDM: project too small

Planner: not decided

Main Risk: small budget, low project owner motivation towards GTZ TA support.





India: PPP-Project with EnviTec Biogas AG



Partner:

EnviTec Biogas AG; Malavalli Power Plant Private Limited – MPPPL; GTZ

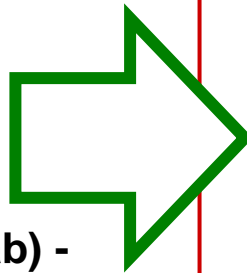
Objective:

Adaptation of the EnviTec biogas technology to Indian conditions, particularly by building reliable policy-makers for sustainable electricity supply through biogas.

By 2012, implementation of 750 MW_{el}

Measures:

- Study of locally available biomass resources and development of a "best practice" – model
- Monitoring of the construction of four plants (MW size) at various locations in India (Maharashtra, Karnataka, Punjab) - strong delay by delaying the start of construction
- Accompanying study of the social acceptance of the plants



- Assistance in determining relevant framework requirements
- Comparison of technologies of biogas plants in India, and Germany
- Analysis of the Input-materials for biogas plants
- Training of the operating personnel
- Sensitisation of decision makers and other actors of the biomass supply chain



India: PPP-Project with EnviTec Biogas AG





Empowering Rural Development by Industrial Biogas Programs in India and the Philippines

Strategic Alliance



Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

EnviTec Biogas





PPP Goal

Rural biomass-based electrification in selected states of India and the Philippines, *via*:

- Establishment of sustainable operating structures
- Conducive policy/regulatory frameworks

Including,

- Optimization of biomass production
- Introduction of organic manure
- Production of electricity for industrial use



Results in India

1. Baseline study for the new target region in Tamil Nadu is available.
2. Improvement of soil fertility from use of organic manure; improvement of yields to boost biomass and food production.
3. Introduction and agronomy training for silage technology and improvement of livestock feed.
4. Organic manure is available and farmers use it.
5. Awareness of industrial biogas as a sustainable growth driver has been broadened.
6. Focused research on sustainable and successful management of biogas plants (research network).



Challenges of biogas projects world wide

- Biogas projects need to be adapted to the location
- Planning defines the efficiency of the plant
- Operators must be trained
- High efficiency and high quality technology require a higher investment
- New markets mean challenges and technical adaptation to the requirements of the country
- German companies in the area of biogas currently do not depend on markets in developing or emerging countries and thus have only limited motivation to develop projects in these countries
- The implementation of large scale projects on an economic base requires the installation of a structure for the operation and maintenance (Maintenance of engines and technical details)



Challenges in developing new biogas markets

- **Technical feasibility** → Availability of materials, know-how, local institutions and personnel, will to implementation, technical adaptation to local conditions
- **Investment security** → legal and political framework
- **Economic framework conditions** → sales possibilities for the products (electricity, heat, gas, fertilizer, CO₂ certificates, environmental services)
- **Sustainability** → assurance of the sustainable operation, knowledge transfer
- **Maintenance structures** → required minimum sizes, know-how
- **Cultural knowledge** → avoid misunderstandings, create realistic planning and implementation planning



The services offered by GIZ for new biogas markets

- Support of First-Movers through PPP-Projects
 - Development and **promotion** of business models
 - **Capacity Building** (project developers, staff for the construction, operation, production of components)
 - Support for **horizontal policy integration**
 - **Advice on grid-feed-in**, grid connection, etc.
 - (Further) development of **licensing procedures**
 - Building of **supply and sales chains** for in- and outputs
 - Development of **standards / quality of infrastructure**
 - Construction of a **biogas partnership network** for the promotion of knowledge cooperation
- “**Service Package Biogas**” to be developed by sector project